

Climate Variability and Impact at NASA's Marshall Space Flight Center

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Climate analysis for the Southeast U. S. has indicated that inland regions have experienced an average temperature increase of 2F since 1970. This trend is generally characterized by warmer winters with an indication of increased precipitation in the Fall season. Extended periods of limited rainfall in the Spring and Summer periods have had greater areal coverage and, at other times the number of precipitation events has been increasing. Climate model projections for the next 10-70 years indicate warmer temperatures for the Southeast U.S., particularly in the Spring and Summer, with some indication of more extremes in temperature and precipitation as shown in the table below. The realization of these types of regional climate changes in the form of extended heat waves and droughts and their subsequent stress on facilities, infrastructure, and workforce could have substantial impact on the activities and functions of NASA's Marshall Space Flight Center (MSFC) in Huntsville, Alabama. This presentation will present the results of an examination of the 100 year temperature and precipitation record for MSFC. Local warming has caused an increase in daily maximum and minimum temperatures by nearly 3F, with a substantial increase in the number of maximum temperatures exceeding 90F and a decrease in the number of days with minimum temperatures below freezing. These trends have substantial impact on the number of heating / cooling degree days for the area. Yearly precipitation totals are inversely correlated with the change in mean temperature and the frequency of heavy rain events has remain consistent with the changes in yearly totals. An extended heat wave index was developed which shows an increase in frequency of heat waves over the last 35 years and a subsequent reduction in precipitation during the heat waves. This trend will contribute to more intense drought conditions over the northern Alabama region, increasing the potential of destructive wildfires in and around the Center. MSFC has begun using this climate change information to adapt short-term and long-term plans for Center operations.

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